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18 August 1982

WEST EUROPE REPORT

SCIENCE AND TECHNOLOGY

No. 116

CONTENTS

BIOTECHNOLOGY

Summary of West European Biotechnological Research (FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT, 30 Jun 82)	1
Researchers at Max Planck Institute Study Agrobacteria (VDI NACHRICHTEN, 28 May 82)	3

ELECTRONICS

French Government Plans to Rebuild Electronics Industry (ELECTRONIQUE ACTUALITES, 21 May 82)	5
Industry A Strategic Area, by P. Schaeffer Taskforce Proposals Fourteen Projects	
Government's Plans To Aid Electronics Industry Take Shape (Jacques Jublin; LES ECHOS, 27 Jun 82)	16
Siemens Develops Flat-Panel Display Technology (DIE COMPUTER ZEITUNG, 5 May 82)	20
AEG-Telefunken Markets New 'Recognition Memory' (DIE COMPUTER ZEITUNG, 5 May 82)	26
New Siemens Automatic Component-Assembling Equipment (FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT, 6 Jul 82)	27
Cameca: High-Technology Circuit-Manufacturing Equipment (ELECTRONIQUE ACTUALITES, 25 Jun 82)	28
Briefs	
Thomson-EFCIS, Motorola Accords	30
NEC in Great Britain	30
MHS, NEC Accord	31
Siemens 64K RAM	31

ENERGY

British To Build 4-MW Wave Power Plant Off Mull (VDI NACHRICHTEN, 28 May 82)	32
French Coal Board Favors Developing in Situ Gasification (Robert Clarke; LE MATIN, 5-6 Jun 82)	34
Briefs	
Swiss Solar Power Plant	36

INDUSTRIAL TECHNOLOGY

French Unmanned Space Factory to Orbit in 90's (AARDE & KOSMOS, May/Jun 82)	37
Ten Small, Medium Companies Use of Automation Described (Alain Jemain; LE NOUVEL ECONOMISTE, 28 Jun 82)	39
Peugeot Automated Workshop Machines Bicycle Parts (Francois Le Brun; LE MATIN, 7 Jun 82)	46
Belgium Enters Robotics Market With Welder (LE SOIR, 9 Jun 82)	48

TRANSPORTATION

Spokesman Comments on Future Dornier Activities (Bernhard Schmidt Interview; AVIATION MAGAZINE INTERNATIONAL, 15-30 Jun 82)	50
Airbus Industrie Says A-320 Will Be Available in 1986 (AVIATION MAGAZINE INTERNATIONAL, 15-30 Jun 82)	53
Prototype of Peugeot Vera 02 Diesel Presented (ATA-INGEGNERIA AUTOMOTORISTICA, Apr 82)	54
Briefs	
French Substitute Fuels	59
Italy Bars Japanese Cars	59

BIOTECHNOLOGY

SUMMARY OF WEST EUROPEAN BIOTECHNOLOGICAL RESEARCH

Frankfurt/Main FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT in German
30 Jun 82 p 5

[Article by TN: "America is giving strong support for Biotechnical Research. German firms are also receiving State Research funds/An overview of the most important countries."]

[Excerpt] Frankfurt, 20 Jun--Biotechnological research is advancing worldwide. An overview of the scientific service of the German parliament for members of Parliament has shown this to be true. Accordingly, in the United States by far the most money is being spent for research and development in the area of biotechnology. The situation of biotechnological research and development in the individual countries is given below:

FRG: Here there is state aid and numerous activity by large chemical companies. Since 1972 there has been significant research funds by the state for biotechnological R & D. A special large research center, the Company for Biotechnological Research, has its emphasis in biotechnology. Even companies are receiving state research funds, for example Bayer, Hoechst, Schering. With respect to the promoted technical areas, the funds from the Research Ministry are spent in the areas of "Pollution Prevention" and in "Fundamental and Natural Pharmaceuticals." The German companies often have cooperation agreements with domestic and foreign research institutes in order to supplement their own research capacity in the area of biotechnology. More precise figures on research funds are not available.

France: France has a number of agrarian and food companies using biotechnological methods. The corresponding research and development efforts seem to be small however. For instance, a domestic enzyme production capacity seems to be missing. Among the companies active in this area are Rhone-Poulenc, Roussel-Uclaf and Saint Gobain. In order to promote developments in the area of biotechnology, a report on "Bioscience and Society" was prepared under contract to the chief of state, which contains appropriate suggestions and recommendations for state support. From this report, the following state-promoted pilot projects resulted: Petroleum substitute, protein production, seed breeding, immunology. With these actions, a considerable increase in industrial production should be attained in this area. A biomass R & D program has been in operation in France since 1974. About DM 8 million in research funds has been appropriated for this.

Great Britain: The biotechnology utilization in Great Britain was investigated by a special advisory committee of the British Government. This committee came to the conclusion that in Great Britain too little was being done in an uncoordinated manner, for biotechnology. Of course, in several areas biotechnological processes have been used successfully and the chemical industry has developed appropriate activities, but State research funds had been small. Overall, according to the report, between DM 16 and 20 million is spent annually by the government of Great Britain for biotechnical projects.

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CSO: 3102/385

BIOTECHNOLOGY

RESEARCHERS AT MAX PLANCK INSTITUTE STUDY AGROBACTERIA

Duesseldorf VDI NACHRICHTEN in German 28 May 82

[Article: "Agrobacteria Know Genetic Manipulation"]

[Text] In the future a bacterium could help to cultivate plants selectively: *Agrobacterium tumefaciens*, as the organism is called, masters by nature the technique of genetic manipulation, that is the purposeful transfer of heredity and lives off this principle as a parasite on plants. At the Max Planck Institute for Plant Research in Cologne, investigators are looking for ways to put this natural talent to work:

In addition to the genetic information which the bacterium injects into plant cells in its own interest, it also transfers other beneficial genes which cannot be introduced by the conventional method of sexual crossing. One thus hopes to cross the heretofore immutable boundaries between the species and arrive at new or improved beneficial plants with previously "incompatible" characteristics. Dr Jozef St. Schell, director of business management at the Max Planck Institute for Plant Research in Cologne, reported on this work recently at this year's MPG convention.

If a plant is injured very close to the ground, large, tumorous growths can develop at the site of the wound within a few weeks. These plant tumors are called root neck galls because of their location at the transition between the root and stem. They are caused, as has been known for decades, by agrobacteria.

Thereupon the previously self-sufficient soil bacteria convert into highly refined parasites. For they no longer live simply as "co-eaters" of the natural offerings of their ecology but induce new genes into the infiltrated plant cells--new genetic information. This triggers on the one hand the unrestricted multiplication of the affected cells and on the other hand re-directs the plant's metabolism to produce bacteria-specific food.

"This strategy of the agrobacteria," explained Dr Joachim Schroeder of the Max Planck Institute for Plant Research in Cologne, "was discovered only very recently. It represents, as what has become known as 'genetic colonization,' not only a completely new form of parasite but at the same time the first and, until now, only example of natural genetic manipulation, or the

purposeful transfer of hereditary factors between completely different forms of life.

Not only genetic technology but evolution itself has thus managed to circumvent those rigid barriers which normally prevent a gene exchange between organisms which are not closely related and not capable of being crossed.

9160

CSO: 3102/370

ELECTRONICS

FRENCH GOVERNMENT PLANS TO REBUILD ELECTRONICS INDUSTRY

Industry A Strategic Area

Paris ELECTRONIQUE ACTUALITES in French 21 May 82 pp 1,5

[Article by P. Schaeffer]

[Text] The Electronics Industry Task Force created on 19 August by government decision, submitted its report at the end of March.

This report considers that the electronics industry is a strategic area of high priority for French electronics. "If France were to conduct a global strategy with only a single industry, it should select the electronics sector," it states.

Its reasoning has long been familiar to our professional organizations, whose major arguments it thus restates, whether discussing the interdependence of all electronics sectors, or the influence of electronics on the development of all the other industries.

In its analysis, the report considers the current situation of the French electronics industry particularly alarming, with a increasingly growing trade balance deficit, and with a degradation of the atmosphere likely to harm our two strong points: professional equipment (especially for military applications), and telecommunications (with telematics).

To reverse this situation, the report recommends a global action at all levels: research, industry, and international cooperation. This action should be founded on 14 national projects (going from VLSI circuits to large computers), patterned after Japan's approach, and should be accompanied by a vigorous training effort (12,000 people to train in the next 30 months).

As for financing this strategy, the report suggests a 50 percent increase in the R&D effort of the industry (which was 12 billion F in 1980), with the understanding that state support should in practice be reserved for national projects.

The report deems international cooperation indispensable, and recommends that priority be assigned to the discovery of European options. "The effort is such that Europeans know that if they fail to unite, they will have to submit to the domination of Japan or the United States." The report notes that recovery for the French electronics industry will be a genuine success only if the industry brings about a global European strategy.

Mr Chevenement, minister of research and technology, and Mr Mexandeau, minister of PTT (Mail, Telephones, and Telecommunications), disclosed the essential features of the report to the press last week, and stated that "these combined efforts should lead to an encompassing project by early summer, which will be proposed to the government so as to contribute to a partial solution of the problems of our economy, its modernization, the recovery of the domestic market, as well as the development of our export trade and of the job market."

A Very Important Document

The report of the Electronics Industry Task Force, drawn by a team formed around Abel Farnoux, and composed of specialists from the major interested ministries, notably industry, defense, PTT, economy and finance, and national education, not to mention research, who was responsible for its formulation, was awaited with interest by all our industries because its conclusions are likely to inspire in the years to come, the government's policy for the development of the French electronics industry.

Such is the importance of this document, that we are publishing extensive excerpts from it in this issue and the next, so that it will be known by all our industries.

The report is indeed important in that it does not represent just one more study on the subject. Written by representatives of the concerned ministries, it reflects a joint effort which should result in a joint strategy. It thus takes into account the plans of the various ministry administrations, which is one of its essential features.

As an example, the industrial action plan currently being finalized by DIELI (Directorate of the Electronics and Information Processing Industries) at the Ministry of Industry, should fall within the general framework of the strategy defined in this report, a correlation which is facilitated by the fact that the director of DIELI is a member of the report's task force.

All these projects should allow the government to take an official position as early as this summer, but it seems a foregone conclusion that the major lines of the recommended strategy will be accepted as such, exactly because they represent an inter-ministry consensus, which if not compelling is no less indispensable.

The only unknown is the level at which the government will retain the report's proposals. In other words, will it follow the task force's recommendations of starting 14 national projects, or if it reduces their number, where will it differ on them? Will it follow exactly the principles recommended by the task force regarding non-dispersion of state support, the sterility of French-French competition, and abandonment of the "controlled delay" policy?

For the rest, it is evident that the enterprise plans of the nationalized groups will follow the government's options, and will each take into consideration the stakes involved in being responsible for one or more national projects.

In commenting on the strategy defined in the report, Mr Chevenement has stated that by 1990 it could bring about a complete revival of the entire French electronics sector, with a trade balance surpluss of the order of 30 billion F, the creation of some 200,000 jobs (including secondary employment), and a leading technologic and industrial position in the world.

"This," he added, "is a good indication of the fundamental priority that the government must give to this sector."

"Today," he continued, "the state's forces act in a disjointed manner; they must be gathered around a single global and strategic policy. Through the clear dialog that they enable between executives and the government, nationalization are in my opinion a decisive factor in formulating and implementing this policy, which of course relies on a dynamic private sector whose ease of development will be a function of the prosperity of the public sector."

Coherence To Be Created

Echoing Mr Chevenement's words, a single global and strategic policy is indeed what the task force recommends for the sake of a much needed coherence, which remains to be created.

The report's central notion is to implement various projects in each of the major sectors of the electronics industry, in which research and industry would be direct beneficiaries, so as to achieve in fact the bond between research and industry, which although always extolled, has been difficult to achieve in reality. At the same time, and also by major sectors, higher education schools specialized by sectors should be founded, as well as national study centers and institutes for the industry.

We will thus reach the desired coherence. Upstream, the major specialty schools and national study centers; downstream, the industries, whether nationalized or not; in the middle, transfer through major national projects.

This plan is actually not original. It is partially implemented in at least two sectors (which are in fact the only ones in which French electronics is obtaining successful results); these are the telecommunications sector, with ENST (National Superior School for Telecommunications) and CNET (National Center for Telecommunications Studies) working on DGT (General Directorate for Telecommunications) projects, and the sector of professional equipment for military use, with ENSTA (National Superior School for Advanced Technology) and CELAR (Center for Electronic Weapons) working on DGA projects.

It is an extension (and a coordination) of this approach that the task force has sought, with the creation of higher education schools and study centers in the automation and office informatics sectors, as well as in the components and consumer goods areas. All things considered, it should be noted that these would not be creations in the literal sense, since education and study activities already exist

in these disciplines, albeit in a scattered pattern: the creation would rather be in a cohesion of the efforts being conducted here and there, which should be united before they are expanded. In the same vein, it should be noted that the widespread use of digitalization beginning in 1985, will bring about a coordination of education with basic research and studies in this technology.

Neither is the concept of national projects original in its broad outline: it has been widely used in Japan, and elsewhere as well. Even in France, projects have always existed, whether in the nuclear, space, or telecommunications fields.

The great merit of the task force rests in adapting this method to straighten out sectors in trouble, and to eliminate various hurdles. The projects must result in industrial products in relatively short times. Once more, it is not a matter of creating from nothing, but rather of gathering the existing strength around something, and of creating a dynamic force. The 14 projects listed by the task force, with their ancillary sub-products, certainly represent what needs to be achieved in order to restore the French electronics industry, but they additionally represent the results that the existing potential can achieve. This is a point which deserves to be made.

The success of these projects as a whole, or of the most important among them, should produce long term effects about 1990. By then, other projects will possibly have been started, or else the method will no longer be needed because the industry will no longer require such help. Or still other, new projects could be started on a European scale: the formula and the procedure permit this flexibility.

Who will be the leaders of these projects? It is of course too soon to know. But the way in which the task force carried out its work tends to indicate that the nationalized groups will be the main beneficiaries. It would be inappropriate however, to believe that the private sector will not be interested, but we will obviously have to wait until all the rules of the game have been set, that is, until after the government will have discussed the report.

It should be noted that for the financing of the strategy defined by the task force, there will naturally exist a separation between research and industrialization. While it is difficult to immediately assign a figure for the latter, which is a task for the industrialist familiar with the overall plan of the Ministry of Industry, it is easier to visualize the R&D situation. Starting with the 12 billion F spent for R&D in 1980, including necessary investments, state aid, and the financing assured by the industrialists themselves for this purpose, the report foresees that R&D expenditures should be increased by 50 percent in constant francs over six years, in order to permit the achievement of the desired goals.

This 50 percent growth must be placed in a general context. First of all, it matches the government's global objectives defined in the law for research orientation and programming. But it especially means that it will keep pace with the turnover growth of enterprises in the French electronics industry, which should eventually result from the recommended actions. There is therefore no particular innovation in this respect: the authors of the report only point out that their strategy consists of making better use or deriving greater value from the sums actually allocated (or planned) for research and development.

Over 10 Years' Time

In formulating its report, the task force has stretched the adoption of the strategy over a rather long time period.

The reason for this is obviously that the recommended recovery measures cannot produce their effects rapidly, and that they must leave a lasting and profound mark on an entire key sector.

That is in fact why this is a global strategy, which upon analysis appears logical and coherent. This is the first time that an action of such scope is presented in France, involving an industrial sector to such an extent.

Their impact and their chances for eventually fulfilling their objectives will be determined more correctly depending on how the government will assimilate the essence of the recommendations.

Whatever the outcome, with this report and especially from the manner in which it is accepted, the French electronics industry will know where the government is leading it in the years to come. Recovery is certainly not guaranteed, but all the necessary conditions should be there to provide it with a maximum number of chances in its favor.

Let us simply point out that it is a matter of creating a surplus of 30 billion F in the 1990 trade balance of our industries, from today's deficit of nearly 1.5 billion F. This is one solid stake among many.

Taskforce Proposals

Paris ELECTRONIQUE ACTUALITES in French 21 May 82 pp 6,7 .

[Unsigned article]

[Excerpt] A Global Strategy

All the sectors of electronics are already interdependent, which was not the case 20 years ago. This synergy will only increase. The electronics industry thus constitutes a whole and can only be treated globally.

The task force believes that France must refuse to adopt a piecemeal policy. An overall strategy for recovery of the industry must be implemented, which will first of all develop our strong points: professional equipment, telecommunications, and telematics. It is only by maintaining these two sectors at the highest world level, that it will be possible to restore the condition of the weaker sectors; and this implies that no reductions should be made in the already insufficient budgets devoted to research, studies, and development at DGA and DGT. It would therefore be useful to effect a recovery effort on the following four major sectors:

Informatics and office automation: these cannot be overlooked. The efforts that have been made so far are nowhere near those that should have been made. This sector deserves to be treated by the government as are telecommunications and telematics, that is, with the same budgets for research, studies, development, and investments.

Beginning in 1983, enterprises in this sector should devote the same amounts for research, studies, and development as the telecommunications and telematics sector. Industrial restructuring should enable a better synergy with the neighboring domain of telecommunications and telematics, around CII-HB as a major focus.

Automation: the competitiveness of the industry as a whole depends on this sector. The annual effort for research, studies, and development should be tripled between now and 1986.

Consumer goods: through its impact on the public, the volume of its business, and its fallout on the programs and components industries, this sector cannot be abandoned. At the same time, the sums involved and the characteristics of the market--France devotes 25 times less than Japan to research, studies, and development in this sector--demand an immediate European cooperation and standardization if the gap is to be closed, with any other solution being a false hope.

Components: research strategy, as well as industrial structures, can be defined only in close relation with the tasks assigned to other sectors (professional, automation, telecommunications, telematics, as well as--and maybe especially--informatics and office automation, and consumer goods). Without a strong and innovative component industry, the French electronics industry will not achieve its goals, and without the guaranteed component market of strong consumer goods, informatics, and other industries, France will not close up its gap in components.

Two sectors, which are not readily recognized as such by the industry community, play a particular role: software and information systems (which includes data banks). These are full-fledged activities which participate in the development of all sectors of the industry, from the military to consumer goods. This trans-sectorial aspect explains the small amount of attention that has been given to these industries until now. Yet, software plays a crucial role: beyond machine configuration, it is software which determines the value of the information being conveyed. From national independence to working conditions, the major political, social, and cultural aspects of the industry's development depend on controlling this "industry of contents and programs." Similarly, information systems will experience an unprecedented development. Their influence will be so strong, and they can be so readily controlled, that it would be of serious consequence not to give them the attention they deserve.

This global strategy, which would not overlook any vital sector of the industry, must be carried out at all levels: research, industry, international cooperation, and support policies, while seeing to it that synergies can take full effect and

that each action is coherent with the policy of the industry as a whole. Such a strategy is not only a necessity (if France were to carry out a global strategy in only one industry, it should select the electronics industry), but is also the most economical to the extent to which it will make use of sector and trans-sector synergies.

Research

The task force recommends a three-pronged action: a global increase in the research, studies, and development effort; the derivation of maximum value from each invested franc through better management; and a restructuring of the research organs working in electronics.

Financial effort. In 1980, the total research, studies, and development expenditures of the French industry (excluding French subsidiaries of foreign groups) amounted to 12 billion francs. The efficiency of research, studies, and development must be raised, and if necessary, the expenditures in constant francs for these activities must be increased, so that the effective improvement will be 50 percent in six years (which matches the global objectives of the government).

Research restructuring. The task force considers that a global recovery policy requires a restructuring of research which will allow constant progress in sectors, specialized education, general research, specialized study centers, technology transfers, industry, and trade, such as have brought success to the telecommunications and professional equipment sectors.

Maximum value derived from each franc invested in research, studies, and development. To assure a better management of public funds, the task force believes that a certain number of principles should be respected:

Start no public support action that is not integrated in the global recovery strategy;

Assign priority to French companies for public support of the electronics industry, and not to French subsidiaries of foreign groups, which does not exclude--rather the contrary--the signing of cooperation agreements with foreign groups as such.

In order to cause maximum value to be derived from each franc, the task force recommends the launching of national projects, which as part of the horizontal progress in the sector, will fulfill the invaluable role of technology transfer. In the form of Public Interest Group (GIP), Economic Interest Group (GIE), or Industrial Development Company (SDI), the national projects would connect public or private research teams with industrialists and users, to introduce new products that involve technologic progress, with industrialization and marketing remaining the responsibility of the industrial partners.

These teams would be gathered under the responsibility of a project leader for well defined projects. This method should make it possible to remove the partition between research and industry, and to integrate industrialization and marketing concepts in the actual design of new products. National projects are the most

economic and efficient technology-transfer organizations that we could find. They are broadly inspired by the working methods that have proven themselves in telecommunications and professional equipment. They transpose into a French context the methods used in Japan and currently intensified in the United States.

This implies that the proportion of public support that will not be allocated to national projects will rapidly decrease, and that the distribution methods for this support must be reviewed.

Industry

Sector restructuring. As in the case of research, the restructuring of the industrial sector must take into account the interdependence of various areas of the industry. It must result in structures which will generate synergies with neighboring sectors, while stimulating competitiveness among various industrial entities, a competitiveness which will also have to consider the existence of foreign pressures. In some cases therefore, it will be necessary to reconsider the existence of an often artificial French-French competition, while the battle is an international one. Quite clearly, the restructuring and boundary adjustments of nationalized companies in the industry (under the jurisdiction of the Ministry of Industry) cannot be examined until the negotiations with Honeywell and ITT, which must be taken into consideration, have been completed. The task force recommends that the structures of the components sector be examined in the light of structures in the finished products sector, which are ultimately the determining factor in their existence.

Implantation abroad. With a domestic market equal to only 6 percent of the world market, the French electronics industry can reach third position in the world only by becoming strongly implanted into foreign markets. The implantation of our industrial groups abroad must therefore be pursued, and cooperations must be sought.

For an industrialist to be internationally competitive today in a given group of products, his production and market must cover 6-10 percent of the world market. No French company can hope for such a market share in any sector, without implantation abroad. Implantation abroad must thus be a rule in the major sectors of the industry. No company in the world, in any country, has sent abroad its research center, its pilot lines, or its basic production. Not IBM, not Philips, not Matsushita/JVC, and not Hitachi. On the other hand, all these large companies use their bases in industrialized countries as so many technologic "sources." The location that the task force deems the most important for such implantation is the United States, both because of the size of its market (basically ten times that of France and one-half that of the world), and because of its technologic wealth (number one in the world). Present implantations of the industry in the United States are insufficient, and especially not adapted to the intermediate and long term cooperation goals between Europe and the United States.

European and international cooperations. For political, economic, and cultural reasons, the task force recommends the formation of cooperations, by assigning priority to European prospects. As a whole, the European market represents nearly 30 percent of the world market, and is on its way to becoming the first market in the world for some sectors. Among the latter is the consumer goods sector, which in any case will be revitalized only through European alliances and cooperations for

new products. Such is the magnitude of the effort that Europeans know they will be subject to domination by the United States or Japan unless they become united. The stakes are such that the policy called "controlled delay," which consists of importing Japanese or American products and then producing them under license, a policy which has failed so far in this domain, can no longer be pursued. France has sufficient commercial and technologic strength to negotiate an egalitarian world cooperation with the Europeans. Technologically united, Europe can become a leader in new consumer goods, whose impact on our civilization and culture will be considerable.

The global strategy for recovery of the electronics industry will be a genuine success if it brings about a European global strategy for the industry.

This is the hope of an increasing number of European electronics specialists and industrialists.

Support Policies

Larger resources for research, study, and development, the restructuring of industrial and commercial structures, and higher investments, will be useless without solid support policies.

To support the development of the electronics industry means first of all the creation of a genuine purchasing and integration policy on the part of the state, as well as on the part of the industries concerned, notably the nationalized ones. This is a "preference" which the European countries would do well to also practice with respect to European electronic products. Japanese enterprises have all practiced a compulsory policy to purchase their components in Japan, beginning with their own component divisions. Philips, the only European group to have practiced the same policy, is today the only European company which holds a high position on the world component market. This purchasing policy, which requires no additional effort, represents a privileged means for launching new products.

To support the development of the electronics industry also means to begin a vigorous training effort. This problem is probably the greatest bottleneck in the development of the industry. Whether jobs are created or eliminated, the industry is upsetting the structure of trades and qualifications. A training system that is structured and flexible at the same time, is the only thing that will make it possible to face this challenge. Excluding the private conventional training system, the cumulated training shortage could approximate 400,000 persons by 1986.

A very thorough restructuring of the educational system is therefore indispensable. For the time being, two decisions should be taken:

Provide each sector of the industry with a specialized higher education school (such as ENST in the telecommunications and telematics sector), either by adapting existing structures or by creating new ones;

Launch a plan which in the next 30 months will close the training gap. This plan should involve 12,000 persons: engineers, technicians, as well as personnel representatives, with the latter being trained in the technologies whose implementation in enterprises they will later have to negotiate.

And finally, to support the development of the electronics industry means to launch a large ergonomic research program that will examine (and act upon) as early as the product design stage, improvements in working conditions and the acceptability of products by the population. This research could result in new generations of products and machines that will concern millions of French men and women by 1990.

A State Secretariat

As we have seen, the community of the French electronics industry is a human combination of office workers in various organs and ministries, nationalized and private industrialists, foreign cooperators in France, and French cooperators abroad.

The coherences and synergies to be created, and the extent of the coordination to be achieved, are of such magnitudes that there is a great temptation to recommend a thorough restructuring of the responsible administrations, in the sense of unifying them.

This could be the task of a state secretariat.

Fourteen Projects

Paris ELECTRONIQUE ACTUALITES in French 21 May 82 p 9

[Excerpt] List of Projects

The task force has formulated a list of 14 national projects, each of which could result in several products. For obvious reasons of commercial (or military secret) strategy, the exact content of these projects is not disclosed, with only the major topic having been communicated.

This list, which clearly relies on existing knowledge and current feasibilities, in no way signifies that the projects listed will be implemented. It only reflects a number of objectives whose implementation the task force recommends at first.

The projects are very different from one another, both in their duration and in their financing.

National Project No 1: Large French scientific and industrial computer.

National Project No 2: Basic building blocks for mini and micro informatics.

National Project No 3: Consumer goods electronic system.

National Project No 4: Display.

National Project No 5: Informatization ergonomics.

National Project No 6: Computer-assisted education.

National Project No 7: Multiservice communications.

National Project No 8: Broad band information communications network.

National Project No 9: Assisted design and fabrication of very large
integrated circuits.

National Project No 10: Computer-assisted design and fabrication engineering.

National Project No 11: Speech processing module.

National Project No 12: Electrophotographic module.

National Project No 13: Electronic publishing.

National Project No 14: Computer-assisted translation.

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CS0: 3102/354

ELECTRONICS

GOVERNMENT'S PLANS TO AID ELECTRONICS INDUSTRY TAKE SHAPE

Paris LES ECHOS in French 27 Jun 82 p 3

[Article by Jacques Jublin]

[Text] A huge French-style Yalta conference is getting underway in electronics. The government is working intensively to formulate "the plan" which should make it possible for France to become the third world power, along with the United States and Japan. As Francois Mitterand formally stated recently: "Priority for industrial investment and superpriority for electronics. Because it is the weapon of the future."

The weapon which will facilitate the creation of jobs, increase the nation's competitiveness, bring in foreign currency, and transform the country into a modern society. Computers, telecommunications, telematics, office automation, robotics, components, and professional equipment, are all included. The state is multiplying its inter-ministry meetings in order to gel the industrial strategy which will make France omnipresent in an activity that promises to be economically larger than automobiles by 1990.

Jean-Pierre Chevenement's determination sets the tone: "If we had to conduct a global policy in one industry alone, it could only be the electronics industry." With considerable ten-year prospects: 200,000 new jobs; a trade balance surplus of 30 billion against a current deficit of 3 billion; a first class technologic position in the world; and a definite independence.

The stakes are so high that the government want to join state groups and private companies for a genuine "national welfare" operation. The projects are quite advanced. And the President should be notified in mid-July at the latest.

Capital endowments of some 2.5 billion francs, of which more than 1 billion for CII-Honeywell Bull. Allocation of about 15 billion francs for research and studies credit, to "prime" enterprises, as compared to 12 billion in 1980. This is the financial background of the government's discussions. As well as the multi-directional negotiations carried out by Alain Gomez (head of Thomson), Georges Pebereau (CGE), Jean-Luc Lagardere (Matra), and Jacques Stern (CII-Honeywell Bull).

The doctrine is clear cut. France must reach a critical mass on an international scale. The technology will be disseminated into all the pores of French society, from shops to offices, and going through the home.

Profound boundary changes will have to be made to discontinue the duplications of useless activities which are damaging the economic efficiency of the French electronics plan. But that does not mean building a French Maginot Line against the United States and Japan. European alliances, in fact, will be strongly integrated into the strategy of the industrial groups.

However, no one is ready to decree with authority that a given enterprise will have one leadership rather than another in a specific specialty. Current analyses are amply sufficient to show who presently has the strongest position for reaching the famous critical mass indispensable at a world scale. Diversifying would be futile, when we know that the American group ATT by itself carries four times more weight than all of the French electronics, which amount to 96 billion francs. IBM is 1.6 times larger than France; ITT one and one-half times; Philips 1.15 times; and Matsushita nearly one time.

This scale of values provides a measure of the effort that has to be made: CGE and Thomson, for instance, are eight times smaller than ATT.

Two Major Companies for Components

Determination but no illusions. How can we imagine that five production companies could subsist in electronic components field? The government's idea is to "ordain" two leaders, Thomson and Matra.

It is up to them to negotiate new agreements with American partners, or to assure the continuation of those existing with Harris, Intel, and Motorola. Alongside, CGE and CII-Honeywell Bull will keep an eye on advanced technology, with preference for what electronics specialists call custom-made integrated circuits.

Bad news therefore, for the National Semiconductor-Saint-Gobain alliance, which is clearly convicted, and for Radiotechnique of the Philips group, because great expectations were placed on the head office for audiovisuals. Beginning this year, 480 million francs of research assistance has been programmed by the state. And between 1983 and 1986, study expenditures for microelectronics should reach some 3.5 billion francs.

A Yalta conference which is equally as necessary for office automation. Can France continue to scatter its financing over about a dozen enterprises? Primarily Thomson, CGE, CII-HB, Matra, Logabax, and Jeumont-Schneider. According to the experts, this is not very reasonable. CGE's progress is incontestable, and so are the prospects of CII-Honeywell Bull.

It is up to Thomson to safeguard its own in a vast concerted action. An action so concerted, that for one of the first times in an industrial plan we find a concrete mention of a "joint economic company," an idea very dear to Francois Mitterand. Private enterprises will stand alongside nationalized ones in the mobilization. "Enterprise agreements" for public groups, "growth contracts" for the private firms.

The financial mechanism is simple: each one undertakes the obligation of social, financial, technologic, and industrial performances, without overlooking exportation.

Yalta conference for mini-informatics as well. Thomson is immediately invited to cooperate with CII-Honeywell Bull, because when you have to face IBM or Digital Equipment it is far better to collaborate on research and development than to selfishly hang on to your know-how.

The time of hidden laboratories is past: everything must be as open as possible. Olivetti still has to be brought into the game, and that is not an easy task. While the Italian group accepted without any reticence the money of Saint-Gobain, its current 23 percent shareholder, it still has to cross the Alps in order to carry out joint industrial developments with France.

Telecommunications are a magnificent illustration of the need for a worldwide critical mass. With its CIT-Alcatel subsidiary, CGE is certainly one of the world's first in "all electronic" telephones.

So much for today, but what about tomorrow? More than one billion francs have to be found to study, develop, and manufacture a modern line of telephone centrals. And this is not within everyone's reach: that is what must be going through the minds of Georges Pebereau and Alain Gomez, since Thomson is the other beneficiary in French telecommunications.

A merger of CIT-Alcatel and Thomson-CSF is not in the cards, Louis Mexandeau, minister of PTT, has recently stated.

But why not get the two companies to merge their brain power, to jointly design future centrals? This project, proposed during the large alliances forged in this branch in 1976, is being seriously reconsidered. France has two choice trumps which can be top cards with ITT, ATT, Ericsson, and the Japanese.

CGE and Thomson, pivot for telecommunications during the next decade. A serious source of worry for CGCT, ITT subsidiary in France. The negotiations which begin this week between the government and the American group, promise to be a clash of giants.

"Unacceptable," is the term used for the demand of 375 million dollars to nationalize CGCT. With its exigent demands, ITT could well be sentencing what once was one of its shining stars.

If ITT, like Honeywell in informatics, is ready for a genuine technologic and industrial cooperation, France will be receptive. But if New York wants to talk only dollars, Paris will act in consequence.

The truth is that the national industrial imperative is far from excluding good and proper alliances, as long as the partners do not propose deceptive associations in which one's independence is rapidly lost.

At its Eindhoven grounds, will Philips hear the message of the socialist industrial policy? Europe can only gain from a "mole" in the audiovisual field, an organized resistance against the Japanese, whether in television, tape recorders, or high-fidelity. And what if the Dutch group was actually ready not to ignore either Thomson or CGE? A European strike force would be born in consumer electronic products and professional electronics.

Philips has everything to gain from sharing the knowledge of Thomson and CGE in professional equipment, from phones to radar, in exchange for its audiovisual know-how.

The old European dream could maybe become a reality since negotiations are very active, and since the industrialists on both sides know quite well that the reality is indeed at hand, as long as they want to successfully resist the Americans and the Japanese.

An international challenge that demands a genuine battle plan, which will be transmitted to Francois Mitterand very soon.

Capital endowments as well, on the order of 2.5 billion francs. Research and development credits of some 15 billion francs, with prospects for 20 billion in 1986, as well as multi-directional actions.

It has already been decided that the 1983 budget will devote more than one billion francs to the "informatization of the French society," compared to 750 million francs for this year. Education will not be overlooked: the manpower shortage is deeply felt. Is Japan not training nine times more engineers than France? And the United States three times more?

The major schools will be strengthened, graduating classes will be accelerated and multiplied, and public laboratories opened and reorganized: the government will use all its available arsenal. If not, there could be a shortage of 500,000 specialists during the next decade.

This is a true intellectual, technologic, industrial, commercial, and financial mobilization. France has an unusually strong lead on FRG, Italy, and Great Britain, and knows that this is where its industrial future lies. And this is the future that will determine the nation's maturity.

11,023
CSO: 3102/367

ELECTRONICS

SIEMENS DEVELOPS FLAT-PANEL DISPLAY TECHNOLOGY

Leinfeld-Echterdingen DIE COMPUTER ZEITUNG in German 5 May 82 pp 34,35,44

[Excerpt] The techniques of information reproduction via optical displays are determined by different parameters: Brightness, resolution, size etc. Large quantities of data and variable display on the one hand, and small geometric dimensions on the other, were diametrically opposing requirements up to now. A completely new display technology will result in particularly flat displays which offer significantly better design potentials and many advantages in application.

The technology of the flat screen built within the frame of a Siemens study is related to existing picture-tube technology (fig. 3).

In the cathode-ray tube, a beam of electrons excites the individual picture points on the screen in sequence--that is, in a series of points--so they light up. At a specified time therefore, only one picture point is emitting light. But this proceeds at such a rapid pace that the eye--due to its inertia--has the impression of a whole picture. On the flat screen however, the picture points are triggered in line-series.

The picture points are arranged in a matrix and provided with x-(rows) and y-(columns) lines. The picture points of a row always appear simultaneously and the picture is built up in multiplex operation by advancing from row to row (fig. 4).

For triggering all picture points, the flat screen is divided into 448 x 720 picture points for data presentation. The row-trigger advances the gas discharge from row 1 to row 448 in sequence. The information to be presented in the activated rows is moved into the shift register of the column trigger, transferred in parallel into an interim store and finally, final stages switch the columns appropriately bright (50V) or dark (0V) according to the information pattern. Two additional brightness values between bright and dark can be tuned.

The needed voltage rise is 50V both for the columns and for the rows. The fluctuation of the output voltage from output to output must be very low, since the eye could perceive irregularities here. The column drivers must also be quite fast (13.6 MHz). The Siemens semiconductor plant developed special drive components for these requirements. The DIMOS (double implanted MOS) technology was used--likewise a special Siemens development (fig. 5).

In addition to the electronics in the display unit, only a flow control and a power pack are used. The screen can then be operated either with its own control unit or via an interface by a computer.

For each of the 2240 characters (80 each in 28 rows) there is a field matrix of 9 x 16 picture points, including spaces between characters. Thus, the capital letters can be displayed in the 7 x 9 matrix (better for the observer) and there are additional picture points for ascenders and descenders. With nine raster points in the horizontal, the distance between adjacent characters can be increased to two raster points instead of the otherwise customary one, which perceptibly improves the legibility of the point.

Since the 448 x 720 picture points are arranged in a full matrix without increased spacing between the rows of characters, with a reduced field matrix, even more than 28 x 80 characters can be displayed. But this permits primarily, excellent graphic presentations. In addition, the advantages of a fixed and fully undistorted picture come into play.

The achieved brightness is 100 cd/m² at a contrast of 15:1 which corresponds approximately to the optimum for VDTs. With the raster 0.40 mm x 0.32 mm, i.e. the spacing of neighboring picture points from middle to middle is 0.40 mm for the rows and 0.32 mm for the columns, good resolution is also achieved.

It is known that at a picture-repeat frequency of 50 Hz, a flickering can just still be perceived. The flat screen is thus operated at 80 Hz. In comparison to a cathode ray tube which is also operated at 80 Hz, only half the maximum frequency (13.6 MHz instead of 27.2 MHz) is needed, since during matrix addressing, the electrode lines on the control plate are triggered from two sides.

In research and Development laboratories around the world, many attempts have been made to excite phosphorus to give off light by using UV light from tiny gas-discharge lanes and thus to build flat screens. All these efforts have failed since the achieved efficiency was on the order of 0.1 lm/W which is much too low. Experimental screens were equipped with water-cooling. The efficiency of 6 lm/W attained in the Siemens study is thus greater by a factor of 60! The power output of the screen, together with the entire drive, is thus only 30 W.

Properties of the Flat, Monochromatic VDT:

Number of characters 2240
Number of character rows 28
Characters per row 80
Field matrix 9 x 16
Capital letters 7 x 9
Rows 448
Columns 720
Picture points 322,560
Brightness 100 cd/m²

Efficiency 6 lm/W
Contrast 1-:1
Raster 0.40 x 0.32 mm
Active surface area 230 x 179 mm
Outside dimensions
320 x 257 mm
Thickness 60 mm
Voltage 250 V, 4 kV
Power output 30 W (with drive triggering)
Picture-repeat frequency 80 Hz

Table 1: In its active picture surface area, the properties of the flat display correspond to a 14-inch display with a cathode ray tube.

Advantages of the Flat Screen over the Cathode Ray Tube:

- small thickness, smaller space requirements
- more freedom in the design of equipment
- direct digital drive
- sharp picture over entire surface area without refocussing
- sharp picture even at high brightness
- fully undistorted picture, perfect linearity
- fixed, steady picture
- simpler elimination of reflections (flat screen)
- lower X-ray emissions.

Advantages of the Flat Screen over Plasma Displays:

- requirements for drive components are lower
- green or white is better than red
- any color desired by the user is possible
- multicolor VDTs are possible
- suitable for TV which is decisive in the long term, for the cost of the screen.

Table 2: The flat display presents advantages over the cathode ray tube and over conventional plasma displays.

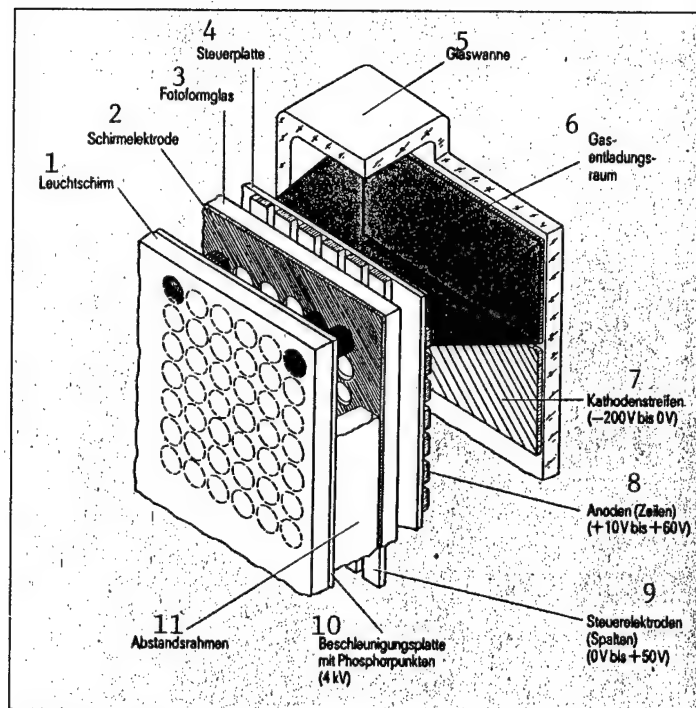


Fig. 3: The design of the flat screen is related to the existing cathode ray tube. The luminous screen is connected with the control plate and glass trough bearing the cathodes, by soldes glass via a spacing frame. The baked-out cell is finally filled with gas and sealed. The luminous screen and glass trough with cathodes are relatively simple parts. The control plate consists of a glass film with hundreds of thousands of holes equipped on both sides with electrode wires in an x- and y-direction. Connected at the output side of the actual control plate is a photo form glass perforated plate with shield electrodes.

- | | |
|------------------------|---|
| Key: 1-luminous screen | 7-cathode strips (-200 V to 0V) |
| 2-shield electrode | 8-anodes (rows) (+10 V to +60 V) |
| 3-photoform glass | 9-control electrodes (columns) (0 V to +50V) |
| 4-control plate | 10-acceleration plate with phosphorus points (4 kV) |
| 5-glass trough | 11-spacing frame |
| 6-gas discharge space | |

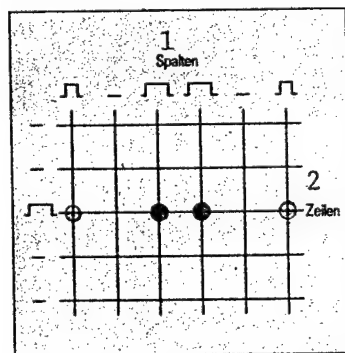


Fig. 4: Each picture points comes into being by matrix triggering with pulse-duration modulation which is used advantageously for brightness control

Key: 1-columns
2-rows

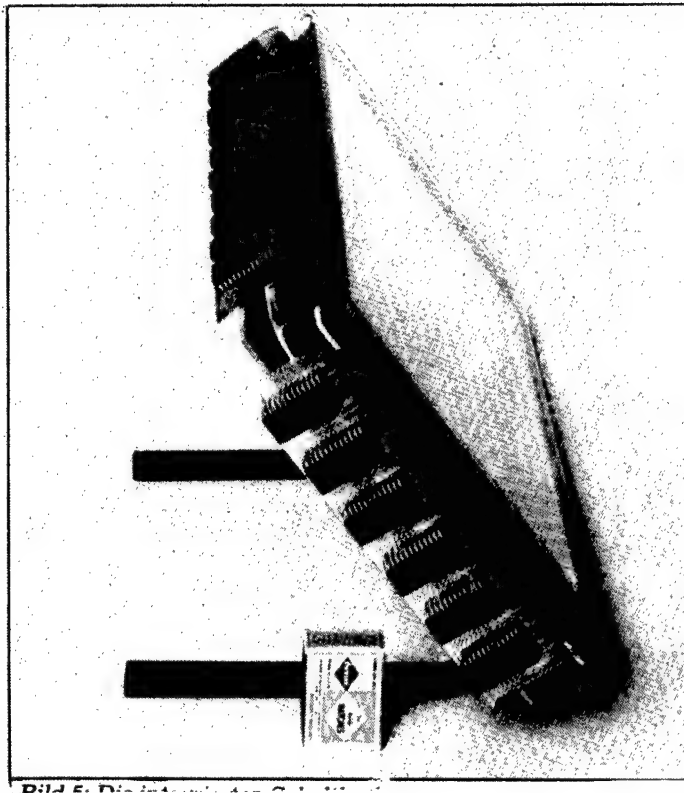


Fig. 5: The integrated circuits were set on wiring foils which are connected on all 4 sides directly to the lines on the control plate. Thus, the entire electronics is right on the display. Display and drive are a compact unit.

9280

CS0: 3102/335

ELECTRONICS

AEG-TELEFUNKEN MARKETS NEW 'RECOGNITION MEMORY'

Leinfelden-Echterdingen DIE COMPUTER ZEITUNG in German 5 May 82 p 1

[Text] According to its own statements, AEG-Telefunken has developed completely new, intelligent auxiliary system which can expand any mini-computer into a thinking data-bank unit. The new system is called "Synfobase" and was presented at the Hannover Exposition this year. For example, in searching an extensive address file for all addresses at a certain location the system does not, as was previously necessary, scan all stored data individually, one by one, but rather scans 32 addresses at a time in one operation. The technology of the associative memory and special software of AEG-Telefunken now permit even a layman without EDP-knowledge to prepare an individual user program himself. The programming language is German.

The rights for world-wide marketing of the REM associative memory module (Recognition memory) were obtained by AEG Telefunken last year from Prof. Sydney Lamb (Rice University, Texas).

The production of Synfobase will begin after the Hannover Exposition in the Computer Science Division of AEG-Telefunken. In 1983, the annual production should be at 10,000 units. AEG-Telefunken will market the new product itself, but will also offer it to other computer firms. As an operating base for the world-wide distribution of "Synfobase", AEG-Telefunken founded a holding company with 90 percent ownership in January of this year in the USA.

In the FRG, according to AEG information, today there are about 100,000 small computers used professionally, and world-wide there are an estimated one million. The rates of growth for this group of small and medium-sized computers are assumed to be 35 percent annually in coming years.

9280
CSO: 3102/335

ELECTRONICS

NEW SIEMENS AUTOMATIC COMPONENT-ASSEMBLING EQUIPMENT

Frankfurt/Main FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT in German
6 Jul 82 p 5

[Text] Prognoses tell that in at most 10 years, at least half of all components will be "unwired." Such components will be set directly onto the conductor plates and connected directly. This "wireless" method increases the packing density, but requires new assembly methods. The Tool and Machine Works of Siemens AG in Munich is now offering an automatic machine which can assemble conductor plates or even ceramic substrates by the "Pick & Place" principle with wireless components. At the same time, the Components Dept. of Siemens has expanded its offering of suitable products, the department reports. The spectrum now ranges from transistors, diodes and diode combinations and ceramic-multi-layer capacitors, out to integrated semiconductor circuits and inductors. All these components can be assembled automatically at a much greater density than before.

As the department also reports, the new automatic assembly machine can handle up to 72 different components supplied in belts or magazines. The central element is an assembly head which takes the component from the belt or magazines with a suction pipette and centers it to the correct installation position by rotating it in two axis-directions. Then the assembly-head sets the component down on the correct position as per its dimensions and holds it down mechanically until the pipette is lifted up again.

With the introduced automatic-assembly machine of Siemens, the components can be attached by two different methods. In one case, the conductor plates receive a solder-paste application by the screen-printing method at defined spots. The set-on components are then soldered in the pusher-type furnace ("reflow"). In the other method, the components are fixed in position by adhesive and then wave-soldered. On the back-side of the conductor plate, any attached, wired components can be incorporated into this solder method.

The automatic machine is programmed via a table-top computer, according to Siemens; it should have an IEC interface and a magnetic tape input. Programming is possible by any assembler using dialog; special knowledge of programming language is not needed. Each automatic machine is of MAT design in order to be able to respond to the individual needs of the specific customer with a separate module. In addition, the automatic machine can be adapted in future to component forms or shapes which are not on the market today.

ELECTRONICS

CAMECA: HIGH-TECHNOLOGY CIRCUIT-MANUFACTURING EQUIPMENT

Paris ELECTRONIQUE ACTUALITES in French 25 Jun 82 p 22

[Article by JPDM: "Cameca Delivers Its First Wafer Stepper"]

[Text] At the end of July, Cameca should be in a position to deliver to Thomson-CSF's bipolar integrated circuit division (DCI), its first wafer stepper, the ARW 610, with a throughput of 60 slices of silicon per hour. A second machine should be supplied to the electronic tube division (DTE) of the same company before the end of the year. It might be recalled that this machine can image 1 micron patterns in mass production, with an overlay accuracy of 0.2 micron from mask to mask.

This machine is eagerly awaited by the European semiconductor manufacturers because its throughput is higher than that of the wafer steppers currently available on the market.

A Beneficial European Plan

The next machines will probably be delivered as part of the European machine plan, which imposes supplier-purchaser relations from at least two different countries for the development and real full-scale testing of advanced technology machines for the semiconductors industry. Cameca thus expects five or six agreements with non-French users in the EEC, agreements which will be proposed before 29 July in Brussels. Each of these agreements will naturally correspond to a sale subsidized by the EEC. These machines will be delivered in 1983, with Cameca's production capabilities during that year being 9-11 machines (which corresponds to the manufacturing area available at that time). A specialized production unit which should employ some 600 people will then be installed somewhere in the country at the end of 1983.

The company's aim in fact, is to produce 100 machines per year in 1988 (for a world market estimated at 1000 machines/year beginning in 1986).

Beginning in 1983, the basic machine will evolve as a function of users' comments, comments which must be made as part of the EEC contracts. These will undoubtedly lead to the addition of sub-systems to complement the basic version. Moreover, an ARW 650LF version will make it possible to cover a wide field of 20 mm or 29 mm in diameter, thanks to a different objective.

The first ARW 610 machines to be delivered will be used by DCI for fast bipolar integrated circuits, and by DTE for electronic imaging devices.

Electronic Mask Maker for LETI

At the same time, Cameca is refining the automation of its FEPG electronic mask maker. The first machine should be delivered to LETI (Laboratory of Electronics and Data Processing Technologies) in a few weeks.

As we remember, one feature of this machine is its throughput of 10 slices/hour (3-inch slices), with 1 micron lines that can be reduced to 0.5 micron if needed (however, the machine has been optimized for 1 micron).

Cameca is currently forming a software team for this machine, which is already compatible with Calma, and will soon be compatible with Davidmann and Applicon. Software that is independent of CAD systems will be developed at the same time.

The second unit of this mask-maker should be delivered in 1983 (maybe to DCI or EFCIS). Some units will then be produced as part of the EEC plan. (It might be recalled that according to this plan, the EEC should subsidize 30-50 percent of the utilization cost over 2-3 years, and 30-50 percent of the training and operating costs of the associated teams). Unlike the wafer stepper market, Cameca is less familiar with the market for this 1 micron electronic mask-maker. However, the real competitor for this machine is known: it is Toshiba.

11,023
CSO: 3102/376

ELECTRONICS

BRIEFS

THOMSON-EFCIS, MOTOROLA ACCORDS--In order to successfully fight the invasion of the European market by Far East 4-bit microprocessors and microcomputers, Thomson-Efcis and Motorola have joined forces to introduce a new family of 8-bit microprocessors, the 6804, which will be sampled by the end of 1982--beginning of 1983. To stem the Japanese invasion by offering more powerful products at the same price as the 4-bit devices, is a vital necessity for these manufacturers; with this family, they are aiming at white and brown products, and at T83 telephone sets. Built with H-MOS AND HC-MOS technologies, these circuits are pin-to-pin compatible with the 6805 family; their identical software assures them with a large body of available programs, since applications for the 6804 family can be developed immediately by simulating the 6805. In terms of design, the chip area is smaller, and its architecture makes it possible to easily produce many versions with RAM, ROM, and different I/O circuits around the central unit; it is thus possible to have a specialized uP or an "almost" custom circuit. In order to find a place on the international market, the planned mass production will have to meet, by 1983, the price of 2-2.50 dollars, established by the manufacturers. Along with the 6804 family, the 6805 series is gaining a new version, the 6805 CT, an 8-bit microcomputer designed to find extensive use in telematics. In addition to the capabilities of its family, it has a serial asynchronous communication interface and a 2 or 4 Kbyte ROM; it will be available by the end of 1982. [Text] [Paris ELECTRONIQUE INDUSTRIELLE in French 1 May 82 p 12] 11,023

NEC IN GREAT BRITAIN--Negotiations are being conducted between British Telecom, the Ministry of Industry, and the Japanese manufacturer of telecommunications equipment, NEC, to study the possibility of locating an NEC plant in Great Britain. The discussions concern a plant costing 50 million pounds (about 550 million francs) in Livingston, as well as NEC's exportations from this British base. The NEC plant would be designed to manufacture technologically advanced telecommunications equipment, as well as office automation products. [Text] [Paris ELECTRONIQUE ACTUALITES in French 11 Jun 82 p 9] 11,023

MHS, NEC ACCORD--An agreement should soon be signed by the Japanese company NEC (Nippon Electric Company) and the French company MHS (Matra Harris Semiconductor), according to which MHS would become a second source for the CMOS uPD 75XX 4-bit microcomputer family. MHS would only reproduce the NEC original architecture using its SAJI IV technology, which is a 2.5 micron-line CMOS. This means that MHS would have to complete the lower end of its uP line, so as to gain access to all types of applications, from toys (4-bit devices should be sufficient, and CMOS consumes little power) to telecommunications (the T 83 comes to mind), depending on product and the peripherals that can be implemented with the originating CPU (A/D converters, PLA, RAM, and so on). On the Japanese side, NEC's interest in this type of agreement, in addition to having a solid second source for one of its family of products, is access to a market--French at first and European later--depending on the success of the operation and the reaction which it would elicit in Europe. Independently of the date on which this agreement is signed, the beginning of mass production for these products in Nantes would take place about 10 months after the official announcement, which probably means during the first quarter of 1983. [Text] [Paris ELECTRONIQUE INDUSTRIELLE in French 1 May 82 p 10] 11,023

SIEMENS 64K RAM--At its Munich and Villach (Austria) plants, Siemens just began producing its 64K dynamic RAM, the HYB 4164, in versions with access times of 150 ns or 200 ns. This memory, which consumes only 150 mW, is claimed by Siemens to have very low sensitivity to alpha radiation, and requires pulsed current supplies of only 10 mA/ns, compared to 10 to 100 times more for conventional memories. The chip area is 29 square-mm. [Text] [Paris ELECTRONIQUE ACTUALITES in French 21 May 82 p 17] 11,023

CSO: 3102/367

ENERGY

BRITISH TO BUILD 4-MW WAVE POWER PLANT OFF MULL

Duesselforf VDI NACHRICHTEN in German 28 May 82 P 5

[Article: "4-MW Demonstration Power Plant Harnesses Wave Power"]

[Text] A Scottish research group may have solved the cost problem associated with generating electricity from wave power and hopes, along with an important British construction company, to get the green light soon to build the first commercial demonstration power plant on the west coast of Scotland.

The 4-MW demonstration facility will probably be built on the Isle of Mull where the Atlantic Ocean unleashes its full wave power. A similar facility, which was also designed by the team at the National Engineering Laboratory in East Kilbride, near Glasgow, could be built in the South Pacific.

Great Britain has given wave-power electricity priority over all other renewable energy sources in view of the enormous energy potential on the open west coast of Scotland and has pursued the associated development work on a practical system for 10 years. Initially the estimated cost amounted to the astronomically high figure of 1 dollar per kWh; however, the latest NEL-generator development has shown that the cost at a Scottish location will be under 10 cents per kWh, making such a facility profitable in comparison to diesel generators which are presently used on several outlying Scottish islands.

The construction cost of the power plant in the South Pacific could be even lower based on using locally available raw materials for concrete, and the research team points out that the quoted cost relates to single modules. Serial production of the 8,000-ton module in shipyards, docks or simple construction berths would lower the estimated construction cost by up to 25 percent.

The generator developed in East Kilbride consists in general of a 65-m long and 35-m high wave breaker, 10 meters of which projects above the surface of the water. It is anchored in a conventional manner with stone blocks at a distance of 1 to 3 km from the coast. The seaward side is provided with openings, and the in-breaking waves increase the air pressure in the upper part of the wave breaker. The compressed air is then used to drive air turbines.

The proponents of the project have submitted the construction proposal to the British Ministry of Energy and hope that the construction work can begin before the end of the year so that the power plant can be ready for service in the winter of 1984. The ministry has already assumed a large part of the cost of an experimental wind-power plant on the Orkney Islands north of Scotland, and it is expected to bear 80 percent of the cost of the wave-power plant.

The NEL generator is one of a group of installations which are being developed in the United Kingdom. Another advanced system based on teetering floats which converts energy via high-pressure hydraulics is being researched at the University of Edinburgh by Stephen Salter. The currently estimated generating cost is 8 cents per kWh; the goal for the perfected system is 5 cents.

9160

CSO: 3102/370

ENERGY

FRENCH COAL BOARD FAVORS DEVELOPING IN SITU GASIFICATION

Paris LE MATIN in French 5-6 Jun 82 p 26

[Article by Robert Clarke: "Gas 'Plants' at Bottom of Mines"]

[Text] A gasification steering committee has just been formed at Charbonnages de France. Its mission: To propose a policy that will enable the use of coal energy where its conventional exploitation is economically or technically impossible. This would involve the in situ transformation of the coal into gas in the underground seams. But while this method is simple, the putting of it into operation is difficult. And its profitability is still uncertain.

Underground gasification of coal is a method of using the energy contained in coal seams that are unworkable because they are either too deep or poorly situated. This method is already in use abroad but in France it is only in its experimental stage: A program will probably be put in place shortly to speed up its industrial development.

Theoretically, the method is of interest: By thus utilizing the deep, inaccessible seams, national reserves could be increased by 2 billion tons. In practice, however, the putting of it in place is unfortunately very difficult and the public authorities are currently hesitating among several methods.

The general method is simple: Two wells are drilled down to the coal seam. Water is injected through one of these at high pressure to fracture the coal. The coal is then ignited to gasify it, and the gas is collected in the second well.

Experimental work is currently under way at Bruay-en-Artois, using two wells drilled to a depth of 1,170 meters. Promising results were obtained in 1980 and 1981, but their economic viability is still a matter of some question. A new experiment is to be carried out in Lorraine, at Faulquemont. The credits allocated to this gasification program, which totaled 30 million francs in 1980, have been increased to 125 million francs up to 1984, and are being subsidized to the extent of 40 percent by the EEC.

The objective is to use this method to produce methane that can be directly substituted for the natural gas currently being distributed in France, which is largely imported. But to do this will require the development of a method to impart to the gas coming from the underground gasification well an adequate calorific content, that is, of the order of 8 to 10 kilowatts/hour/cubic meter. Such a method is currently under experimentation, but it furnishes a gas that will have no economic interest unless the price of energy rises still further, which is probable.

Meanwhile, it is possible to produce gases that are less rich in energy content but usable industrially at a price ranging between 12.5 and 14.5 centimes per kW-hr, versus 11 to 13 centimes for natural gas. The Americans have already spent close to 4 billion francs for the study of this technology without having as yet chosen among competing methods.

Actually, there have appeared, very recently, "third generation" systems, some using the heat from nuclear power plants and others using new chemical reactions to accelerate the gasification process and increase its yield.

Gaz de France has instigated the creation of groups that include French industrialists, its purpose being to assist them in positioning themselves in the international competition in this field, where the Germans, such as Lurgi, and the Americans already occupy major positions. The first French in situ gasification unit could be in operation by 1984. The relevant decision has been taken by Charbonnages de France jointly with Gaz de France and is aimed also at speeding up the development of this pilot plant, which is to furnish 400 tons per day.

9399

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ENERGY

BRIEFS

SWISS SOLAR POWER PLANT--Zurich--The daily NEUE ZUERCHER ZEITUNG of 22 April announced that a Swiss syndicate is considering the construction, in 1984, of a solar power plant in the Alps. Several Swiss enterprises will participate in the SOTEL (Solar Thermal Electricity Plant) project, whose construction will take two years. The announcement went on to say that the promoters are seeking 2.3 million Swiss francs (6.9 million FF) in order to complete their preliminary studies. The site of the plant, whose maximum power production will be of the order of 5 megawatts, has not yet been selected, but it should be in the south of the country. The SOTEL project plans to erect a field of 500 solar mirrors with an area of 50 square-meters each. The solar radiation collected by the mirrors will be transformed into steam, which will operate a turbogenerator. The total surface of the installation will be 125,000 square-meters. The syndicate estimates the price of a KW/H produced by this plant to be one Swiss franc, which is expensive now but could become competitive by the end of the century. [Text] [Paris AFP SCIENCES in French 29 Apr 82 p 29] 11,023

CSO: 3102/344

INDUSTRIAL TECHNOLOGY

FRENCH UNMANNED SPACE FACTORY TO ORBIT IN 90'S

Huizen AARDE & KOSMOS in Dutch May/Jun 82 p 283

[After the United States and the Soviet Union, France is one of the most important nations in space travel. CNES (the National Center for Space Research), the umbrella organization for French space activities, regularly comes up with new ideas. One of those is SOLARIS: an automated factory in space.

The Aerospatiale company has already made a general study of the unmanned space station and probably Matra will also receive an order from CNES to study the practicability of the project "Station Orbitale et Laboratoire Automatique de Rendez-vous et d'Intervention Spatiale" [Orbital Station and Automatic Laboratory for Docking and Communications in Space]. According to Aerospatiale, such a project could very well be realized. The machine could revolve around the earth as early as the 1990's.

The Machine

According to the Aerospatiale proposal, SOLARIS will have a rectangular exterior. It looks very much like an earlier idea that was called MINOS.

Launch weight will be about 4,600 kilograms. The launch will have to be accomplished with an Ariane-4 rocket, which will place the vehicle at an altitude of 800 kilometers. The space station will consist of a central unit, with two large solar panels and a parabolic antenna for communications purposes. For that matter, communications with the earth will be carried out via two communications satellites, which are quite comparable with the "Tracking and Data Relay Satellite System," which the United States is developing for its Space Shuttle. Manipulator arms are also mounted for such purposes as to assemble other space constructions.

Radar apparatus and an oven will be installed in the artificial satellite. The radar installation is intended for remote sensing activities, to observe the earth, while the oven will be used to produce materials and medicines which cannot be manufactured properly on earth. For example, by making use of the "absence" of gravity, in space materials having widely different specific gravities can be mixed well. That is not possible or very difficult on our planet. One

of the products of this space manufacturing is the experience that will have been gained by the time of the European space laboratory Spacelab, which will be very valuable.

Transportation To and From

It is expected that SOLARIS will be able to carry out its mission for approximately 15 years. In this operational period, the space station will have to be supplied at least 30 times by an unmanned spaceship (see AARDE & KOSMOS, 7/1980). This machine will be launched, like the artificial satellite itself, from the launching base Kourou in French Guyana. An Ariane-4 puts it in the vicinity of SOLARIS and after a few days the two space vehicles dock.

In the intervening time, the supply ship has orbited the earth completely independently. For this purpose, it is equipped with solar panels and a command unit which contains the flight and drive systems. The load (a maximum of 4,000 kilograms) is housed in a separate freight compartment. When docking has been completed, the load, consisting of fuel, spare parts and naturally the material to be processed in the oven, is transferred to the factory satellite. That is done, like the docking, with the aid of SOLARIS's manipulator arms. After processing, the materials are transferred once again into the supply ship, which then separates from the space station and after some time the freight compartment dives into the sea near the coast of French Guyana. The service compartment burns off in the atmosphere.

This is how the transportation to and from will be accomplished. Equipping the transport module with four small reentry capsules instead of one has already been considered. They would then be able to return to earth independently. It is thought that it will cost about 500 million guilders to realize the SOLARIS project. France cannot put up that money by itself, so negotiations are under way with other countries as to possible cooperation.

France in Space

Thus, it is still in doubt whether SOLARIS will come about, but it is certain France does not want to lose its leading role in the world of space travel. The country is one of the most important members of ESA [the European Space Agency] and has a flourishing space industry.

In 1981, the budget for space expenditures was about 1.1 billion guilders. That money was allocated to the Ariane carrier rocket, the European Spacelab and to the development of the Franco-German [FRG] telecommunications satellite, the German part of which has become questionable due to financial difficulties. A large figure was also allocated to SPOT (System Probatoire d'Observation de la Terre [Experimental Earth Observation System]), a satellite to observe the earth which is to be launched with the Swedish Viking satellite in 1984 (see AARD & KOSMOS, 12/1980).

6940

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INDUSTRIAL TECHNOLOGY

TEN SMALL, MEDIUM COMPANIES USE OF AUTOMATION DESCRIBED

Paris LE NOUVEL ECONOMISTE in French 21, 28 Jun 82

[Article by Alain Jemain: "Small and Medium-Size Enterprises That Recapture the Market"]

[21 Jun 82 pp 62-63]

[Text] In Paris, the Robotics Show and the International Congress have just closed. After drawing larger crowds and more buyers than expected. And after initiating international recognition for French technology.

The tactical exercises which have caused so much excitement in the international world of robotics during the past few months may have been somewhat misleading. When IBM, General Motors, General Electric, Westinghouse sign cooperation agreements with the Japanese giants to produce robots in record time and under competitive conditions, they are interested first and foremost in standard, mass-produced equipment. MATRA [Mechanics, Aviation and Traction Co.], CGE [General Electric Company] and maybe Renault are using the same approach to get a piece of the action by negotiating agreements which would give them quick access to new technologies or enable them to assume international dimensions.

But this robotics of the giants is far from being all there is to robotics. In spite of their financial, industrial and commercial power, the heavy weights of data-processing, electronics or the automobile cannot take all the ground. Many sectors and subsectors are looking for specific equipment designed and manufactured to suit their needs. The extension of process-control and robot applications concerns all industries and, as a result, a large market is now opening itself to the small manufacturers who are clever enough to hang on to one specialty.

LE NOUVEL ECONOMISTE has selected 10 French small and medium-size enterprises who started with such an analysis of users' needs. Some were created from scratch during the past two years. Others are small enterprises who recently reconverted from a traditional line of business to industrial process-control, manipulators and robots. All are trying to offer equivalent equipment at competitive prices and, above all, to keep offering one-of-a-kind products

at prices acceptable to the buyers. Most of them do not receive any state subsidies. We shall introduce the first five companies this week. Five more profiles will be published next week.

CODIM DK: The Self-Taught Inventor

Mr Rene Hemidy who, with his cousin, Mr Jean Leguen, manages CODIM DK, headquartered in Gonesse (Val d'Oise), started by graduating from elementary school at age 10. On the banks of the Odet, until he reached military service age, he manufactured charcoal for gas generators, for a wage of 1 franc per day. Vocational training courses enabled him to become a qualified draughtsman and he found a job in a tap factory at La Courneuve. He used his small savings and those of Mr Leguen, a metal turner, to buy a second-hand lathe.

At 20, he was working 8 hours a day at the tap factory, and another 8 hours as "self-employed craftsman" for Avions Dassault for whom he manufactured jacks as a subcontractor.

Today, Mr Hemidy heads the design and marketing departments of CODIM DK while Mr Leguen is in charge of administration; the company manufactures a broad range of 20-1000 injection presses for plastics. It has sold 350, especially to Moulinex, Telemecanique, SPIO [expansion unknown] (a subsidiary of Renault) and to Citroen. As a result of the recession, its turnover has dropped to 50 million francs (compared with 70 million in 1974) and it employs only 200 people, compared with 400 seven years ago. Nevertheless, it broke even in 1981. Mr Hemidy is very proud of his new microprocessor control-computer which can produce color graphs; he also expects a great deal from the patent he has just filed for an infrared probe system which uses optical fibers and would permit real-time injection.

Laser Technique: The Recycled Math Teacher

An associate professor of mathematics, Mr Claude Benedite, 46, specializes in a small field where the only competitors are a few Japanese, German and American companies. He was teaching at a lycee in the Paris area when, in 1976, by chance and through family connections, he decided to "enter the industry."

After 22 years as a teacher, he settled in Limoges and became general secretary of a photoengraving enterprise. He never again left either industry nor Limousin. His idea: to offer industrial applications for laser, and equipment made to order (electric motor milling, leather, sheetmetal or ceramic cutting, marking, etc.). In 1980, he made his move. With 700,000 francs, 3 associates and support from the local SDR [Regional Development Company], Mr Benedite started a small business in Saint-Cyr, a village of 320 inhabitants, 35 km from Limoges. Four months later, after canvassing France, he had to change his strategy. His potential customers were more numerous and also more specialized than expected, and wanted equipment tailored to their needs. As a result, the new Laser Technique company embarked on the manufacture of special highly-automated machines based on laser properties. Its customers today: the CEA [Atomic Energy Commission], Renault, SNIAS [National Industrial Aerospace Co. (Aerospatiale)], Philips, Chaussures Eram. Last year, its

turnover came close to 20 million francs. The enterprise has 20 salaried employees but it holds a 15-20 percent interest in, and subcontracts work to, 5 local companies engaged in precision mechanical engineering, data-processing and process control. Next October, Mr Benedite will introduce a robot with five degrees of freedom for the manipulation of parts under a laser beam. He breaks even in spite of his purchases of components paid for in dollars.

Automatique Industrielle: Sponsored by Big Names

Its turnover (12 million francs expected in 1982) and its personnel (30 people, most of whom are engineers) classify this company among the small and medium-size enterprises. Even though its prestigious shareholders (SG 2 [expansion unknown], the data-processing subsidiary of Societe Generale, has a 40 percent interest, the Peugeot group 40 percent, and Rhone-Poulenc and Pechiney-Ugine-Kuhlmann 10 percent each) and its current contracts seem to show promise of a change in size during the coming years. Created in 1980 and headed by Mr Pierre Lhermitte, Automatique Industrielle started by working on the design and specifications of the flexible automated workshop that Citroen is now fitting out in Meudon. Introduced at CODIS [expansion unknown], and approved by the Ministry of Industry, the project is about to be realized. The deadlines were met and the flexible automated workshop, which will become operational in June 1983, will be able to machine any type of parts that will fit in a 500 mm cube. Contract amount: 35 million francs over 30 months. Some 15 additional projects are in progress, including another flexible workshop for the CGE group. Automatique Industrielle just opened a subsidiary in California and ambitions to place its knowhow at the service of small and medium-size enterprises. "Without, for all that, advocating the development of automation at all costs."

Heliot: The Spinning Robot

The world textile industry is about to become one of the largest markets for process-control systems: the Heliot family, of La Chapelle-Saint-Luc near Troyes, has decided to find its niche in it. Created in 1929 by the father of the present president, Mr Daniel Heliot, 61, the enterprise is now employing 200 people, some 30 of which in research and development.

In 1981, 9 percent of its 59 million franc turnover went to the design department. Specialized for 2 generations in textile machinery sold under the Heliot name--85 percent of which are now exported to some 60 countries--it has just perfected measuring and control devices for the final stages of tubular knit finishing. Since the early 1960's, it has also diversified in special machines tailored to the needs of the most varied industries (40 to 60 percent are sold abroad).

Following on his automated Teintofix and Module machines for the knitting and finishing of hosiery, Heliot is now starting the production of robots, especially for textile spinning. Its projects in progress include: the automation of the tubular knit processing line using a microcomputer, and a shaping machine for pantyhoses that will automatically slip them on and off traditional forms.

Roboplast: The Hydraulic Line of Business

Mr Jean-Claude Piquet, 39, went through the French Navy and the Air Force School before discovering his true passion: hydraulic manipulators and robots. In 1967, after resigning from the army, he joined Jeumont-Schneider in Amiens where he was in charge of heavy sheetmetal work. Three years later, still in Amiens, he was production manager for plastics module parts at Veglia. He then discovered a new market: the automation of molding processes. At Veglia, he made radical changes in plant production processes. From 1975 to 1980, Veglia's personnel dropped from 144 to 38; at the same time, production hours increased from 110,000 to 170,000. He received a premium from the Northern France Social Security Health Fund for drastically reducing the number and seriousness of industrial injuries.

That year, he created his own company with a capital of 250,000 francs, and called it Roboplast. Its objective: to design hydraulic manipulators with programmable controllers that can be adjusted along three axes, and hydraulic robots with five degrees of freedom piloted in real-time by a computer. The first-born of Roboplast, Mercure 82 (50 percent of the prototype design and realization program were financed by ANVAR [National Agency for the Valorization of Research]), is specialized in the extraction of parts and the placing of inserts on injection presses. With a precision of 0.05 mm and a motion velocity of 1.2 m/sec. Its price: 165,000 francs for a robot that can be adapted on a 200-ton press.

[28 Jun 82 pp 54-55]

[Text] Ten French small and medium-size enterprises who dare compete with the giants of robotics and process-control. Last week, LE NOUVEL ECONOMISTE introduced the first five profiles. Here are five more. All these entrepreneurs have understood that, next to the standard equipment offered by multinational companies, there remained an unclaimed area: the market for equipment made to order. We must wish that more such small and medium-size "pilot fish" enterprises accompany the offshoots of CGE, MATRA, Renault, Peugeot, Thomson and the CEA.

SIREIX: The Agricultural and Foodstuffs Subsector

Mr Georges Sireix, 40, went through the Conservatory of Arts and Crafts so he would no longer be taken for a self-taught man, an eccentric one for some, a genius for others. He graduated in 1974, after seven years of evening classes, as a mechanical and automation engineer.

Immediately afterward, in Mulhouse-Kingersheim, he created an enterprise specialized in designing, building and perfecting prototype machines for the packaging of agricultural products and foodstuffs.

Since then, he has been all over the world and cannot meet the demand. This year, with the 45 employees of Sirex SA and the small AMGH [expansion unknown] company of Saint-Louis, 40 km from his first plant, specialized in the produc-

license to him and giving him the usual innovation premiums. Three machines were built and sold, 10 are on order. In 1980, MECA 07, still in cooperation with ITF, introduced a machine that could automatically edge and sew curved parts. Five are now under construction, seven on order. The last born, the CPP00, will automatically sew stripes on T-shirt sleeves. During the past two years, MECA 07 doubled its personnel (24 employees, including 6 in the design department now headed by Mr Roland Martin, a process-control specialist) and tripled its turnover, which should get close to 8 million francs (20 percent of which from exportations) in 1982.

CETRA: Bongrain's Intelligent Pallets

A graduate of the Viollet School of Engineering, Mr Jean-Louis Boisseau, 37, launched CETRA (Center for Technical Design and Applications) in 1973, after spending three years with Heliot, the textile machinery manufacturer (see LE NOUVEL ECONOMISTE No 342). His starting capital: 5,000 francs borrowed from a bank. In 1978, CETRA became a subsidiary of Bongrain and now employs 65 people; this year, it will have a turnover of 25 million francs, break even, and become one of the leaders in loading and palletization robotics.

Today, its main production remains automatic packaging machines. Through customization, they can process ice-cream as well as car seats, personal care products as well as household appliances. To develop these machines, CETRA received a robotics loan of 6.7 million francs from Credit National. Introduced last year, the first three robots were delivered to Valeo, the leader in automotive equipment; the fourth robot went to a cheese factory (packing rate: forty 6-kg straw-packed cheeses per minute). The end of this year should see the introduction of the first palletization robot "with six, maybe even eight degrees of freedom and with non-fixed programmable sequences." Over one third of CETRA's turnover comes from exportations, and not more than five percent from Bongrain.

Montornes: Robotization of Wood-Processing

Mr Herve Montornes, 33, is a former student of the Montbeliard Technical Center. With a passion for general mechanical and electrical engineering. In 1968, he returned to his village of Colombier-Fontaines, to the small family enterprise created five years earlier and where industrial packaging was made to order. And he persuaded his father, Mr Paul Montornes, that they must market new products. In this instance, a line of industrial chain-saws that could cut boards, rafters and beams quickly and precisely, and would be programmed so as to use only the correct type of wood.

Ten years later, they had won their wager. Montornes is still producing packaging for Peugeot, Alsthom, and CII[expansion unknown]-Honeywell-Bull, but it also manufactures the Debimatic machines, six computer-controlled wood-processing machines which, according to their ads, will "cut along the contour you design and mass-saw according to the parameters you display." And they can do this 24 hours a day. The cutting precision is of the order of the

millimeter, and the processing rate 140 m per minute. Montornes's sawing facilities provide a turnover of 8 million francs, including 1.5 from export sales; it employs some 15 people, including 4 in the design department.

"Last year, 26 percent of our mechanical engineering department's time was devoted to the development of new equipment." Since 1968, Mr Herve Montornes has acquired 350 customers, 40 of whom for his robotized equipment. Among his projects are facilities to handle Landes pine, and the conversion of ERC [expansion unknown], a Haute-Saone company he just bought, to manufacture manipulator arms for the loading and unloading of his wood-processing machines.

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CSO: 3102/395

INDUSTRIAL TECHNOLOGY

PEUGEOT AUTOMATED WORKSHOP MACHINES BICYCLE PARTS

Paris LE MATIN in French 7 Jun 82 p 10

[Article by Francois Le Brun]

[Text] From our special correspondent in Dannemarie--1882: the first bike rolls out of the Peugeot plant. 1982: the company inaugurates an automated shop to manufacture motorcycle gear boxes. It is the first of its kind in Europe. Betting on technology, the Sochaux Lion intends to confront the Italian and Japanese competition. In addition, it has formed a trade association with Honda on this project.

They held a village celebration on Thursday in Dannemarie, seat of the Territoire-de-Belfort district, to celebrate the union of Peugeot-cycles with robotics. The dowry is appropriate: seven machining centers programmed entirely by a central automatic device, which is itself controlled by a computer. The cost of the investment is 260 million francs. The installation was designed on the site and built by an Alsatian enterprise with a long tradition, Graffenstaden Machine-Tools, a subsidiary of CIT-Alcatel.

The robotized plant will build gearboxes for the new Peugeot line, the Scoper. The Sochaux company has placed its bets on technologic progress in its products as well as in their fabrication. "It is a matter of restoring our competitiveness against the Japanese and the Italians," explained Bertrand Peugeot in his presentation speech, "and to reduce the inflation differential by obtaining production growth."

In other words, the company is resetting its watch to the 20th Century, which is a nice way to celebrate its centennial. But in fact, independently of any symbolism, this was first of all the price to pay for obtaining help from Honda, a valuable partner in seeking to recapture markets, especially in Europe. The ultimate objective is to export one-half of the production. Projects for China and Venezuela are underway.

The results of these efforts are impressive, with three orderly arrays of futuristic, clanking robots sheltered behind the brick walls of a former textile plant. The factory was repurchased in 1971 by the Societe Mecanique du Haut-Rhin, an 82-percent Peugeot subsidiary. At the time, it was turning out typewriters.

Picture steel parts about the size of a large cigar, which get placed in bins at the foot of a machine. Human intervention stops there, because remote handling arms then take over completely. At the end of the cycle, the parts emerge in the form of gear clusters, the basic element of the gearbox, after having been roughed out, milled, bored, and lubricated, all of these operations having previously been issued as commands to the machine. The latter can fabricate many other parts, merely by programming the intervention of the appropriate tools.

In the fall, it will thus produce engine parts for the Honda plant in Belgium. Similarly, arrangements have been made with Renault and Talbot for machining gearbox components.

The 271 employees of the Dannemarie shop have been guaranteed job security, despite automation of production facilities, and despite the doldrums which have recently afflicted the two-wheel market in France. Last Thursday was certainly a day for local celebration.

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CSO: 3102/349

INDUSTRIAL TECHNOLOGY

BELGIUM ENTERS ROBOTICS MARKET WITH WELDER

Brussels LE SOIR in French 9 Jun 82 p 4

[Article by R. (V.)]

[Text] Verviers, 7 June--The first Belgian robot, named Phenix, was born at Ensival (Verviers) in the shop of the Distribe Company. Four years of research and development were necessary to perfect this machine, which inaugurates Belgium's active entrance on the robotics market. The Phenix concept was born under the pressure of three new factors observed by R. Debronne at the time he started his distributing company for gas welding equipment: the development and technology of microinformatics, the need to rapidly adapt automatic machines to diversified production, and the need to increase production rates.

This Verviers businessman detected early in the game, the eventual danger that the automation of all industrial sectors represented for his trade. He took the risk of competing against himself by reducing his investment in conventional products to concentrate his strength on robotics.

The sales of mechanical welding equipment decreased by 30 percent; however, thanks to the fabrication of automatic welding machines--an intermediate stage toward robots--his turnover increased significantly, and his personnel grew from six to fourteen.

From 1977 until 1980, a particularly active research team surveyed the market, visited all the industrial fairs in Europe, took robotics courses abroad, and ended up by defining the profit to be obtained from a robot designed for arc welding.

The brilliant idea on which the Phenix is based, is the wrist: it automatically corrects for angular variations of the torch as a function of the position of the joint to be welded; and it also lays circular or linear welding beads with or without sweeping, independently of arm translations.

The Phenix robot is being offered right now. Distribe1 has completed the prototype of a second robot for welding large parts (50 m long). The robotics study group created within the enterprise works non-stop on the design of other types of robots and automated installations. Although a small Ensival company, Distribe1 wants to retain its lead in the complete automation of arc welding. Beginning in June, the Phenix will be presented at the Paris Robotics World Fair, the Leningrad Automation Fair, and in 1983, at the Chicago Robotics World Fair.

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CS0: 3102/349

TRANSPORTATION

SPOKESMAN COMMENTS ON FUTURE DORNIER ACTIVITIES

Paris AVIATION MAGAZINE INTERNATIONAL in French 15-30 Jun 82 p 25

[Interview with Bernhard Schmidt, spokesman for the management of Dornier, by Pierre Sparaco: "Questions To Bernhard Schmidt"; date and place of interview not specified]

[Text] [Question] The German aerospace industry, taken as a whole, appears to be facing a very delicate problem with respect to the future. In effect, growing budgetary difficulties could delay the launching of major new military programs. In this context, how do you view Dornier's future distribution of its civil and military activities?

[Answers] The ideal situation toward which we would like to aim would be to succeed in maintaining the present level of our military activities and, in addition, to bring together the requisite conditions for a development of our civil programs. This of course requires adequate technical and financial bases. The essential problem presently being posed, however, remains unsolved, namely, that of the uncertainties bearing upon German defense policy. It includes not only budgetary questions but also questions relative to the manner of proceeding, that is, relative to what use is to be made of available funds. There can be no question of the difficulty, under these conditions, of trying to see clearly ahead, and even to the end of this decade. We can, at the very most, say only that our situation looks favorable up to and including 1985.

[Question] All of this notwithstanding, can you expect to attain the situation you have just mentioned, that is, stability in your military and growth in your civil activities?

[Answer] The fact is that circumstances may require that we seek an accelerated growth in our civil activities to offset a possible decline in our military contracts.

[Question] In either case then and from an overall standpoint, is Dornier planning to expand?

[Answer] Yes. We must make good our enterprise's growth potential, we must increase our overall annual turnover. But it is also desirable to reposition this

objective within a framework of activities that is not solely aeronautical but that will continue to include, besides planes, weapon systems in their broader sense, space contracts, etc.

[Question] With some very few exceptions, the world aeronautical situation is not on the rise. Is not your rather unusual response overly optimistic?

[Answer] The very big aeronautical companies and those of our size have different concerns. The "big ones" have more of a problem than we. It is unquestionably less difficult for us to be thinking in terms of growth than it is, and especially so, for specialized builders in certain sharply defined sectors. Better than not, is to replace one major program by two others of more modest dimensions.

[Question] Your intent then is to avoid any situation of overdependence on a single program?

[Answer] Exactly. Otherwise, we would be in danger.

[Question] On the other hand, is it not more complex to manage a large number of small programs?

[Answer] Yes... if you are a big enterprise!

[Question] With respect to future military programs, what can you say as of now regarding the outlook for the MPA [Military Patrol Aircraft] 90, the maritime surveillance plane of the 1990's you are now working on?

[Answer] In this domain it would be well to coordinate the European efforts as a whole, the more so since there is in Europe a potential market of the order of 140 units, in due time, to replace the equipment currently in service. True, it may seem ambitious to include Great Britain in this outlook but, from the standpoint of continental Europe alone, the viewpoint should be one that takes us beyond 1989, the roll-out year of the new-generation "Atlantic."

[Question] Will German investments currently under way or already completed lead to a new operational version of the "Alpha Jet?"

[Answer] The supercritical wing and the CCV [Control Configured Vehicle] technique provide a low-cost solution to the improvement of low-altitude maneuverability, from the standpoint of new missions such as antihelicopter warfare. While present budgetary circumstances may not be ideally suited to the propounding of this idea, perhaps the work now being done on this can lead to additional orders for Alpha Jets, within 4 years, for example. The only other solution would be to choose a completely new type of plane.

[Question] What is the status of your third-level, 30-passenger LTA [Light Transport Aircraft] plane project? What role is it likely to play in Dornier's civil activities future?

[Answer] It is a project that somewhat exceeds the financial capabilities of our company, since it is a pressurized plane. This explains why we are seeking partners. We are in contact with two builders, in India, in fact. The definition of the plane is under way and the program could be launched within 1 year. The potential market was attractive 3 or 4 years ago, and now, finally, it is again the case. But we are also considering other formulas, namely, planes of lesser capacity.

[Question] On the whole, then, you are seeking partners in several domains. Is this the case with the amphibious Do-24TT as well?

[Answer] First of all, this is a program that could be more appropriately classified as technological. Initially, we want to study the characteristics of a new type of wing for this specific use, and then devote our attention to the potential market. It is on the basis of flight tests that we will be able to determine what the Do-24TT's true capabilities are.. The market, on the other hand, is difficult to circumscribe, since we are not dealing with a conventional type plane. This calls for prudence before going ahead with it. It should be pointed out, nevertheless, that some 600 planes of this class are in service throughout the world.

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CSO: 3102/359

TRANSPORTATION

AIRBUS INDUSTRIE SAYS A-320 WILL BE AVAILABLE IN 1986

Paris AVIATION MAGAZINE INTERNATIONAL in French 15-30 Jun 82 p 39

[Text] Mr Bernard Lathiere, managing director of Airbus Industrie, exudes confidence as he looks beyond the current conjunctural circumstances that have plunged the transport aircraft industry into crisis. He speaks very harshly, on the other hand, with regard to a campaign being pursued on the other side of the Atlantic to denigrate European efforts: "The arguments being advanced are ridiculous to the point of laughter." Airbus Industrie, he adds, has fought tooth and nail to find a place in the sun, but certainly not to try to become a monopoly: "We wish our competitors a long and difficult life."

The Airbus A-320 will be "available by the end of 1986," assert the documents handed out at Hannover. This is one of the components of our long-term strategy, explained Mr Roger Beteille, director general, a strategy that includes also the different TA-9, -11 and -12 projects.

Tests of the A-310 have already brought the most recent addition to our family to a stage close to that of certification, said Mr Bernard Ziegler, director of testing: 95 hours of flight with two planes, the flight domain fully explored at all CG's, and the certainty reached that contractual performances will be amply met. Every sortie (average duration of which has been 4 hours) has been made with a two-man crew, despite the workload imposed by a test program. One of the results of these tests has unquestionably brought into being a whole, sizable new dossier, namely, that of the FFCC [Forward Facing Crew Cockpit].

Industrial candidates for participation in the A-320 are multiplying: Airbus Industrie mentioned Canada, Italy and Fokker, the Dutch builder, who has taken the initiative on new talks; these talks are, for the time being, still only entirely preliminary.

9238

CSO: 3102/359

TRANSPORTATION

PROTOTYPE OF PEUGEOT VERA 02 DIESEL PRESENTED

Turin ATA-INGEGNERIA AUTOMOTORISTICA in Italian Apr 82 pp 275-279

[Excerpts] The Vera 02 Diesel prototype, presented to the public for the first time on the occasion of the recent Geneva exposition, marks an important new step in the research conducted by Peugeot in the difficult field of energy-saving.

Conceived, appropriately, for the Energy-Savings Agency (AEE), it is inspired by the philosophy that presided over the development of the preceding gasoline-fuelled Vera 01, but with an additional objective: to develop a specific diesel engine that is particularly sober but at the same time capable of furnishing performance characteristics higher than those of the gasoline-fuelled model taken as a reference for the Vera design--that is, the gasoline-fuelled 305 GL.

The Vera 02, equipped with a turbocompressed diesel engine of 1,360 cm³ and capable of putting out 45.6 kW coupled to a 5-speed transmission, is capable of providing a fuel saving of \approx 45 percent as compared with a conventional vehicle and 30 percent in comparison with a diesel auto of equivalent class. The new car model developed by Peugeot therefore answers fully to the expectations, as was the case with the Vera 01. The latter, developed on the basis of a medium-size, high-diffusion car (the 305 GL), made it possible to obtain an average saving of 35 percent.

Particularly interesting is the performance sheet for the new Peugeot experimental car:

0 to 100 km/hour in 13.1 seconds

0 to 400 m in 18.7 seconds

0 to 1,000 m in 35.4 seconds

Maximum speed 158 km/hr

Conventional consumption, according to the ECE [expansion unknown] norms, is: 3.5 and 5 liters per 100 km at 90 and 120 km/hr, respectively; 5.2 liters per 100 km in the urban cycle.

Starting from the mechanical and structural base of the Vera 01, the main problem to be solved by the Peugeot technicians was the choice of the engine. It was necessary to achieve power on the order of 45 kW with the lightest engine possible. The choice of basic engine fell to the 1,360 cm³ XY gasoline engine presently used on the 104S, the ZS and the Samba GLS. In addition, this engine offered the possibility of coupling to a 5-speed transmission.



Figures 1 and 2--Even though the aerodynamic definition of the Vera 02 is identical to the 01, the result is slightly lower: C_x Vera 01 = 0.305; C_x Vera 02 = 0.316.

Nevertheless, a natural-intake diesel engine derived from that engine would not have made it possible to obtain the power and torque required (34 kW instead of 45 kW and 78 Nm instead of 108 Nm). The choice therefore went to supercharging by means of a turbocompressor. Furthermore, Peugeot was the first builder to offer to its European clientele, in January 1979, a car with a turbocompressor-supercharged diesel engine: the 605 Diesel Turbo.

It is well-known, though, that this type of supercharging is effective at high engine speeds, with lack of torque at low speeds. This is even more noticeable in a low-displacement engine. To remedy this disadvantage, the Peugeot technicians modified the characteristics of the turbocompressor, which, combined with a special calibration of the wastegate valve, made it possible to improve the turbocompressor's response. This made it possible to achieve satisfactory torque at low speed and gave the possibility of using a "long" transmission ratio appropriate for keeping fuel consumption down.

In the table below, we present the principal characteristics of the supercharged DX3T 4-cylinder engine as compared with the XID engine in the 305 GRD car. This engine's characteristics thus prove more advantageous, and the increased efficiency due to high supercharging with a torque increase of 41 percent at 2,500 RPM and 39 percent at maximum-power engine speed [as published].

Comparison of the Principal Technical
Characteristics of the DX3T and 305 GRD Engines

	DX3T Engine <u>Vera</u>	XID Engine <u>305 GRD</u>
Bore (mm)	75	80
Stroke (mm)	77	77
Displacement (cm ³)	1,360	1,548
Maximum DIN [German Industrial Standards] power (kW)	45.7	36
Maximum-power engine speed (RPM)	4,500	5,000
Maximum torque (Nm)	112	85
Maximum-torque engine speed (RPM)	2,800	2,500
Compression ratio	28.1:1	22.5:1
Specific power (kW/dm ³)	33.6	23.2
Specific torque (Nm/dm ³)	83.5	55.1
Mass (kg)	120	128
Specific mass (kg/kW)	2.62	3.55

Description of the DX3T Engine

Among the engine's structural characteristics, it is to be pointed out that the original structure--that is, both the engine block and the head are of aluminum alloy--is used in this supercharged diesel version also. The cylinder cams, which are inserted, are of strengthened cast iron. Cylinder head with camshaft that controls the valves directly. Four intake valves of \emptyset 35 mm and stem \emptyset of 8 mm, and four exhaust valves of \emptyset 29 mm. Brass valve guides. The precombustion swirl chambers are of the Ricardo Comet V type.

In view of the very high pressures involved (120 bars), all the moving parts are designed specifically:

- special aluminum-alloy pistons with cast-iron insert for elastic compression ring;
- connecting rods of nitrogen-hardened forged steel, with larger-diameter pins;

- drive shaft of forged steel with antivibration pulley on five main bearings;
- Bosch VE-4 injector pump with flow control linked to supercharging pressure;
- supercharging by KKK type K14 turbocompressor driven by the exhaust gases.
The compressor overpressure ratio is 1.8:1 with "wastegate" valve integrated into the turbine casing.
- lubrication by means of a geared pump whose rate of flow has been increased by 30 percent, so as to ensure lubrication of the organs specific to the DX3T engine--the turbocompressor bearings and the cooling of the piston bottoms.

The Turbocompressor

Despite the engine's low displacement, very homogeneous supercharging characteristics have been achieved by means of a prototype turbocompressor group of reduced dimensions, specially designed and capable of enabling the "turbomachine" to maintain acceptable outputs at all everyday engine speeds.

The "wastegate" valve limits the supercharging ratio starting from 3,000 RPM under full load. In addition, in order to compensate for the turbocompressor's lack of efficiency at low engine speeds and decrease its consumption, the following provisions have been adopted:

- distribution timing with advanced intake-valve closing (32° after dead center);
- compression ratio of 21.8:1, with ratio slightly higher than 1:1 between pre-combustion-chamber volume and combustion-chamber volume.

Transmission

The elements that make up the transmission are the same as for the Vera 01 gasoline engine:

- 5-speed transmission, positioned under the engine. The speeds at 1,000 RPM in the various ratios are: 1st--8.7 km/hr; 2nd--14.61 km/hr; 3rd--22.5 km/hr; 4th--32.41 km/hr; 5th--39.65 km/hr;
- the final gear ratio is 3.055:1 (18/55);
- the tires adopted are standard reduced-profile Michelins, type TRX E, 170x65x340.

Masses Kept Down, Quietness

Adoption of diesel motorization necessitated further work on the body so as to keep the noise and vibration levels down to those of a gasoline-engine car of the same class.

Among the solutions adopted we mention the padding of the floorboard so as to absorb acoustical emissions; the shielding placed at the bottom and on the sides of the engine compartment to reduce the noise transmitted inside and absorb the gear-engagement noises during slowdown phases.

The total mass of all the added equipment is 4 kg, which is a reasonable increase if compared to the total lightening of 185 kg under the 305 GRD and 135 kg under the 305 GL. These weight-savings are the result of research at all levels (body, accessories, mechanisms, etc) and of the use of light materials such as fiberglass-reinforced polyester (doors) and, more generally, synthetic materials.

This lightening, together with the special-design power train and the improved aerodynamics (roughly 30-percent better than the 305 GRD), make the Vera 02 Diesel a valuable laboratory for study of solutions applicable, as regards energy-saving, to assembly-line models.

Comparison of Vera 02 Diesel Prototype with Assembly-Line Cars

	305 GL <u>gasoline</u>	305 GRD <u>Diesel</u>	Vera 02 <u>Diesel</u>
Mass in operating condition	925	975	790
Maximum DIN power (kW)	47.7	36.0	45.6
Maximum-power engine speed (RPM)	6,000	5,000	4,500
Maximum speed (km/hr)	147	135	158
Maximum RPM at maximum speed	5,450	5,000	3,980
Acceleration (seconds):			
0 to 100 km/hr	16.9	22.3	13.1
0 to 400 m	19.9	21.7	18.7
0 to 1,000 m	37.7	41.2	35.3
ECE consumption (liters per 100 km):			
at 90 km/hr	6.5	5.3	3.5
at 120 km/hr	9.1	7.7	5.0
in urban cycle	9.5	7.0	5.2

11267

CSO: 3102/325

TRANSPORTATION

BRIEFS

FRENCH SUBSTITUTE FUELS--The French Petroleum Institute and the Solar Energy Commission have just launched a research program on the use of alcohols and vegetable oils in motors. Vegetable oils actually offer advantages, particularly in the operation of Diesel motors, these oils being compatible with gas oil. The base product would be rape oil. Research will concentrate mainly on economic yields and on the best way of using it, that is, either vegetable oil alone or mixed with the gas oil. The Solar Energy Commission has also committed itself to supporting the SEMT PIELSTICK company (ALSTHOM ATLANTIQUE group) in its efforts to develop a large methanol dual-fuel Diesel motor. The SNCF's [French National Railroads] locomotive engines, for example, could benefit from the fallouts of this research. Based on this assumption, it has been calculated that the SNCF could save 140,000 tons [tons of oil equivalent], in gas oil, per year. [Text] [Paris AFP SCIENCES in French 3 Jun 82 p 28] 9399

ITALY BARS JAPANESE CARS--Italy has obtained authorization from the EEC Commission to suspend indirect importations (that is, importations made through third countries belonging to the Community) of Japanese cars. Italy currently limits the importation of "Made in Japan" autos to 2,200 cars per year. Nevertheless, many Japanese cars have been introduced into Italy through other EEC countries. According to the Commission's decision, Italy can be exempted from the EEC norms that impose free circulation of goods within the Community, by virtue of the so-called "safeguard" clause provided in the Treaty of Rome, inasmuch as the Italian automobile industry is going through a difficult period. Italy is therefore authorized to suspend, until 30 June, all indirect imports of autos produced in Japan. [Text] [Turin ATA-INGEGNERIA AUTOMOTORISTICA in Italian Apr 82 p 262] 11267

CSO: 3102/325

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